

TWO NEW SPECIES OF *CROITANA* WATERHOUSE (LEPIDOPTERA: HESPERIIDAE) FROM CENTRAL AUSTRALIA

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Abstract

Croitana arenaria sp. n. and *C. aestiva* sp. n. are described from the Alice Springs area, central Australia. Adults and the male and female genitalia are figured, compared with each other and with *C. croites* (Hewitson) from Western Australia.

Introduction

The genus *Croitana* Waterhouse was established in 1932 to contain a single species, *Cyclopides croites* Hewitson. *Croitana croites* was then known to occur in coastal areas of Western Australia from Bunbury to Carnarvon and inland at Pindar. These inland specimens were separated as *Mesodina croites pindar* Waterhouse in an earlier paper in 1932.

A specimen of *Croitana* was first recorded from central Australia by Waterhouse (1937) who mentioned a very worn male from Hermannsburg in the British Museum (Natural History). He tentatively included it in *Croitana croites pindar* and this arrangement was followed by Evans (1949). Six specimens of *Croitana* were taken in central Australia by Mr M. S. Upton in February 1966. Common and Waterhouse (1972) stated that the series collected by Mr Upton probably represented a distinct subspecies and did not recognize subspecies *pindar*. I took a further 34 specimens of a *Croitana* species near Alice Springs in September and October 1978 and when they were compared with those taken by Mr Upton, many differences were immediately noticed. This suggested the presence of two species in central Australia both closely related to *C. croites*, but neither more closely resembled *C. croites* than the other. Further examination has confirmed this view.

Evans (1949) used the term "eyelash" for the tuft of scales between the base of the antenna and the eye and nudum for the unscaled part of the antennal club. Evans' use of these terms is followed here as these structures are otherwise unnamed.

Key to the species of *Croitana* Waterhouse

1. Yellow area of hind wing above with veins M_3 , CuA_1 and CuA_2 black scaled. Cilia uniformly coloured or faintly chequered *aestiva* sp. n.
- Orange area of hind wing above with veins M_3 , CuA_1 and CuA_2 orange scaled. Cilia conspicuously chequered 2
2. Hind wing beneath with dark spot between R_s and M_1 well separated from spot between M_1 and M_2 *croites* (Hewitson)
- Hind wing beneath with dark spot between R_s and M_1 adjacent to spot between M_1 and M_2 *arenaria* sp. n.



1



2



3



4



5



6



7



8

10 mm

Figs 1-8. Upper and underside: (1, 3) holotype ♂ *C. arenaria* sp. n.; (2, 4) paratype ♀ *C. arenaria* sp. n.; (5, 7) holotype ♂ *C. aestiva* sp. n.; (6, 8) paratype ♀ *C. aestiva* sp. n.



9



10



10 mm

11



12

Figs 9-12. Upper and underside: (9, 11) ♂ *C. croites* (Hewitson) "Bunbury, W.A. Oct. 2, 1961"; (10, 12) ♀ *C. croites* (Hewitson) "Wembly, W.A. Sept. 20, 1961".

Croitana arenaria sp. n.

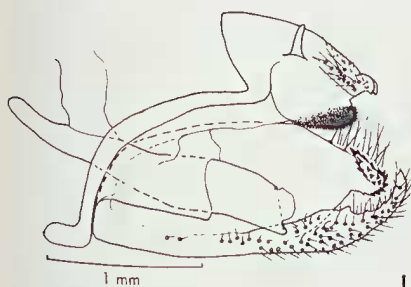
(Figs 1-4, 15, 16)

Types: — *Holotype* ♂ labelled "23.36S 133.35E 32 km WNW of Alice Springs, NT 8 Oct 1978 E. D. Edwards," Reg. No. 3295, in Australian National Insect Collection. 28 ♂♂, 5 ♀♀, *paratypes*: 9 ♂♂, 1 ♀, with same label data as holotype (1 ♂, 1 ♀, genitalia slide M554 and M513 respectively); 13 ♂♂, with same label data as holotype but dated 30 Sept 1978 (1 ♂, genitalia slide M555); 3 ♂♂, 1 ♀, "23.41S 134.15E 39 km E of Alice Springs, NT 25 Sept 1978 E. D. Edwards"; 2 ♀♀, "23.59S 133.56E 32 km S by E of Alice Springs, NT 23 Sept 1978 E. D. Edwards"; 1 ♀, "24.11S 134.01E 56 km S by E of Alice Springs, NT 24 Sept 1978 E. D. Edwards" (genitalia slide M556); 1 ♂, "23.38S 133.53E Todd River 9 km N by E of Alice Springs, NT 10 Oct 1978 E. D. Edwards"; 1 ♂, "22.54S 135.28E Plenty River 187 km ENE of Alice Springs, NT 14 Oct 1978 E. D. Edwards"; 1 ♂, "23.00S 136.08E Plenty River 245 km ENE of Alice Springs, NT 14 Oct 1978 E. D. Edwards"; all in Australian National Insect Collection except for 5 ♂♂ paratypes dated 30 Sept 1978, one in each of the following institutions: Australian Museum, British Museum (Natural History), National Museum of Victoria, Queensland Museum, South Australian Museum. A very worn male in the British Museum (Natural History) labelled "Hermannsburg, central Australia; H. J. Hillier 1911-311" probably belongs to this species but is excluded from the paratype series.

Distribution: — The species is known from five localities within 60 km of Alice Springs, Northern Territory, and from the Plenty River at Huckitta Homestead (187 km ENE of Alice Springs) and also on the Plenty River at 245 km ENE of Alice Springs. The specimen in the British Museum (Natural History) is from Hermannsburg, 116 km W by S of Alice Springs. The species has been taken in September and October.

Description:— *Male* (Figs 1, 3). Head black with scattered pale yellow scales, pale yellow scales around eye, "eyelash" black; antennal shaft black ringed with pale yellow, club bent before middle, apiculus blunt, with black and pale yellow rings anteriorly, black towards tip, pale yellow posteriorly, nudum 12 segmented; labial palpus above second segment black with many scattered pale yellow scales; terminal segment black with scattered yellow scales, beneath pale yellow. Thorax: above black with pale yellow hair scales; beneath pale yellow, legs pale yellow; hind tibia without median spurs. Abdomen: above black ringed with pale yellow scales at the rear of most segments, scattered yellow hair scales, tip pale yellow; beneath pale yellow. Fore wing: costa slightly convex at base and slightly concave towards end of cell, apex moderately pointed, termen evenly rounded, dorsum straight; above dark brown, basal one-third with scattered pale yellow scales, three subapical confluent pale yellow spots, one between R_3 and R_4 , one between R_4 and R_5 and one between R_5 and M_1 , two subterminal confluent pale yellow spots distal to subapicals, one between M_1 and M_2 and one between M_2 and M_3 , two confluent pale yellow spots, one between M_3 and CuA_1 with base near origin of M_3 , one between CuA_1 and CuA_2 well separated from spots between M_1 and M_3 , a pale yellow spot anterior to $1A+2A$ at two-thirds extending half way to CuA_2 , large pale yellow spot in cell from one-third to five-sixths length of cell, extending nearly to costa, confluent with a pale yellow spot between base of CuA_1 and CuA_2 , a further confluent pale yellow spot between CuA_2 and $1A+2A$, inner margin of these spots ill defined owing to heavy pale yellow scaling, cilia pale yellow, black at tips of veins; beneath dark brown, apex pale yellow surrounded by scattered yellow scales; subapical and subterminal spots distributed and coloured as on upperside, spots between M_3 and CuA_2 orange, end of cell dark brown margined distally by heavy scattering of orange scales, large spot in cell extending to base and end of cell orange, costa pale yellow, small orange spot posterior to origin of CuA_2 , cilia pale yellow, black at tips of veins. Hind wing: rounded, tornus very slightly produced; above dark brown with scattered yellow hair scales near base, large orange patch extending from just before end of cell to halfway to termen and from R_s to $1A+2A$, sometimes with smaller orange subbasal spot in cell, cilia pale yellow, black at tips of veins; beneath pale yellow, fine terminal pale yellow-brown line, anal area yellow, two rows of yellow-brown, sometimes yellow-grey, spots, one subterminal other submedian, all spots in each row confluent, both rows running from $Sc+R_1$ to $1A+2A$, subterminal spots between M_1 and M_3 extending to termen, cilia pale yellow, brown at tips of veins. Fore wing length 11-13 mm.

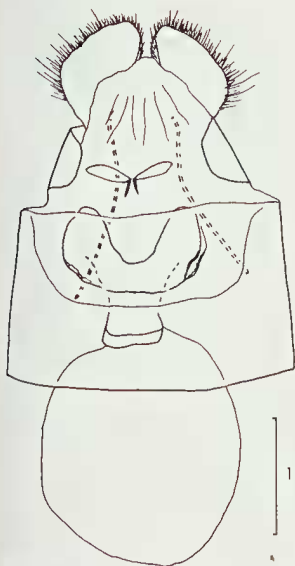
Male genitalia (Fig. 16). Combined tegumen and uncus hood-shaped, much shorter than valva, tip of uncus with two dorsolateral curved projections, lateral lobes from junction of tegumen and uncus long; gnathos with ventral surface covered in fine spinules. Valva with ampulla well developed, tip heavily toothed not curved inwards; harpe narrow, curved dorsally; saccus well developed. Aedeagus long, gradually broadened posteriorly.



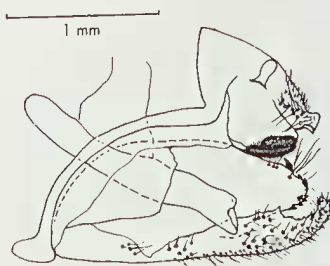
13



14



15



16

Figs 13-16. Male and female genitalia: (13, 14) *C. aestiva* sp. n.; (16, 15) *C. arenaria* sp. n.

Female (Figs 2, 4). Similar to male but with fore wing narrower and termen more rounded, pale yellow spot on fore wing above extending from CuA_2 to $1A + 2A$, this spot also visible beneath. Fore wing length 11-14 mm.

Female genitalia (Fig. 15). Two sclerotized lobes of lamella postvaginalis poorly developed; a broad U-shaped sclerotization, slightly folded at edge, on dorsal wall of well developed sinus vaginalis, lamella antevaginalis heavily sclerotized, broadly U-shaped, slightly folded at edge; ductus bursae heavily sclerotized, short; corpus bursae spherical without accessory pouch; abdominal segment 7 of fairly uniform width.

Comments:— In both sexes the size of the spot between CuA_2 and $1A + 2A$ in the fore wing varies greatly and in the female the size of the spot in the cell

of the fore wing above also varies greatly. The sizes of the other spots in both sexes are less variable. The orange subbasal spot on the hind wing above varies in size or may be absent. There is little variation in the distribution of the spots on the underside of the hind wing but the colour varies from yellow-brown to yellow-grey.

C. arenaria can be distinguished from *C. croites* (Figs 9-12) by the different wing shape. In *C. arenaria* the termen in both fore and hind wing is more evenly rounded than in *C. croites*. In colour, specimens from the northern end of the range of *C. croites* may approach that of *C. arenaria* and although the spots on the underside of the hind wing tend to become indistinct in *C. croites*, they are always distinct in *C. arenaria*. All spots in the subterminal band on the underside of the hind wing are confluent in *C. arenaria* while in *C. croites* those between $Sc + R_1$ and R_s and between R_s and M_1 are well separated from the others. The subterminal line of spots ends at $1A + 2A$ close to the termen in *C. arenaria* while in *C. croites* it ends conspicuously further from the termen. The length of the fore wing of *C. arenaria* varies from 11 - 13 mm in males and 11 - 14 mm in females while that of *C. croites* varies from 12 - 14 mm in males and 13 - 16 mm in females.

C. arenaria was taken in the Macdonnell Ranges, in low hilly areas and in sandplain areas. Females were usually taken feeding at flowers of the family Asteraceae but one was taken flying amongst grasses and another stunned by collision with a vehicle. Males were taken defending territories they had established. In hilly areas territories were in dry creek beds up to 2 m wide where males rested, with wings held vertically, on small stones or on sand. When disturbed by another insect they usually returned immediately but rarely did so when disturbed by a human intruder. Males were very alert and were stalked from a distance of about 10 m from which distance they blended well with their surroundings. In sandplain country they were less easily found although tracks, roads and sandhill crests were searched. However males may establish territories on tracks as several were found on the radiator of a vehicle after it had been following tracks. On the Plenty River males were not found on the broad sandy river bed but on the banks of the river where vehicle tracks and washaways had created bare areas of sand.

Croitana aestiva sp. n.

(Figs 5-8, 13, 14)

Types: Holotype ♂ labelled "16 miles W of Alice Springs, NT 9 Feb 1966 Britton Upton & McInnes" Reg. No. 3296 in Australian National Insect Collection. 4 ♂♂, 1 ♀, *paratypes:* 3 ♂♂, 1 ♀, with same label data as holotype (1 ♂, 1 ♀, with genitalia slide M123 and M552 respectively); 1 ♂. "Standley Chasm NT 9 Feb 1966 M. S. Upton"; all in Australian National Insect Collection.

Distribution: - The species is known from the area 25 to 41 km west of Alice Springs, Northern Territory, in February.

Description: Male (Figs 5, 7). Head black with scattered pale yellow scales, pale yellow scales around eye, "eyelash" black; antennal shaft black ringed with

pale yellow, club bent before middle, apiculus blunt, with black and yellow rings anteriorly, black towards tip, pale yellow posteriorly, nudum 13 or 14 segmented; labial palpus, above second segment black with many scattered pale yellow scales, terminal segment black, beneath pale yellow with few scattered black scales. Thorax: above black with pale yellow hair scales; beneath pale yellow, legs pale yellow, hind tibia without median spurs. Abdomen: above dark brown with scattered yellow scales, particularly towards rear of each segment, tip pale yellow with scattered dark brown scales; beneath pale yellow. Fore wing: costa slightly convex at base, slightly concave towards end of cell, apex moderately pointed, termen convex near apex, straighter towards tornus, dorsum straight; above dark brown, basal one third with scattered pale yellow scales three subapical confluent pale yellow spots, one between R_3 and R_4 , one between R_4 and R_5 and one between R_5 and M_1 , two subterminal confluent pale yellow spots placed distally of subapicals, one between M_1 and M_2 and one between M_2 and M_3 , two confluent pale yellow spots, one between M_3 and CuA_1 with base near origin of M_3 , one between CuA_1 and CuA_2 , well separated from spots between M_1 and M_3 , a pale yellow spot anterior to $1A + 2A$ at two-thirds extending half way to CuA_2 , large yellow spot within cell extending from half to four-fifths length of cell, confluent with a small spot at origin of CuA_1 , a further confluent pale yellow spot between cubital vein and $1A + 2A$ bisected along fold by black scales, cilia dark brown; beneath dark brown some pale yellow scales towards apex, spots distributed and coloured as on upperside except large spot in cell extending to costa and base and large confluent spot between CuA_2 and $1A + 2A$ absent, cilia yellow-brown sometimes faintly chequered. Hind wing: rounded, tornus slightly produced; above dark brown with scattered yellow hair scales near base, large yellow patch between M_1 and M_3 extending from end of cell half way to termen, adjoined by three yellow spots, one between M_3 and CuA_1 , one between CuA_1 and CuA_2 and a small spot between CuA_2 and $1A + 2A$, these spots separated by fine lines of dark brown scales, cilia dark brown; beneath pale yellow-brown, darker towards costa, termen and anal area and paler between M_1 and M_3 and CuA_2 and $1A + 2A$, two rows of yellow-brown spots, one subterminal other submedian, subterminal row with spots between $Sc + R_1$ and R_5 and M_1 well separated, spots between M_1 and M_2 , M_2 and M_3 , M_3 and CuA_1 , CuA_1 and CuA_2 and spot posterior to CuA_2 all confluent, submedian row with spots between $Sc + R_1$, in cell and between CuA_2 and $1A + 2A$, the first separate but last two confluent, cilia yellow-brown and sometimes faintly chequered. Fore wing length 12-13 mm.

Male genitalia (Fig. 13). Combined tegumen and uncus hood-shaped, much shorter than valva, tip of uncus with two dorsolateral curved projections, lateral lobes from junction of tegumen and uncus long and narrow; gnathos with ventral surface covered in fine spinules. Valva with ampulla well developed, tip narrow and curved inwards and anterodorsally, heavily toothed; harpe narrow, curved dorsally; saccus well developed. Aedeagus long, gradually broadened posteriorly.

Female (Figs 6, 8). Similar to male but with wings longer, narrower and termen more rounded and with yellow area in cell on underside of fore wing enclosing a black spot. Fore wing length 14.5 mm.

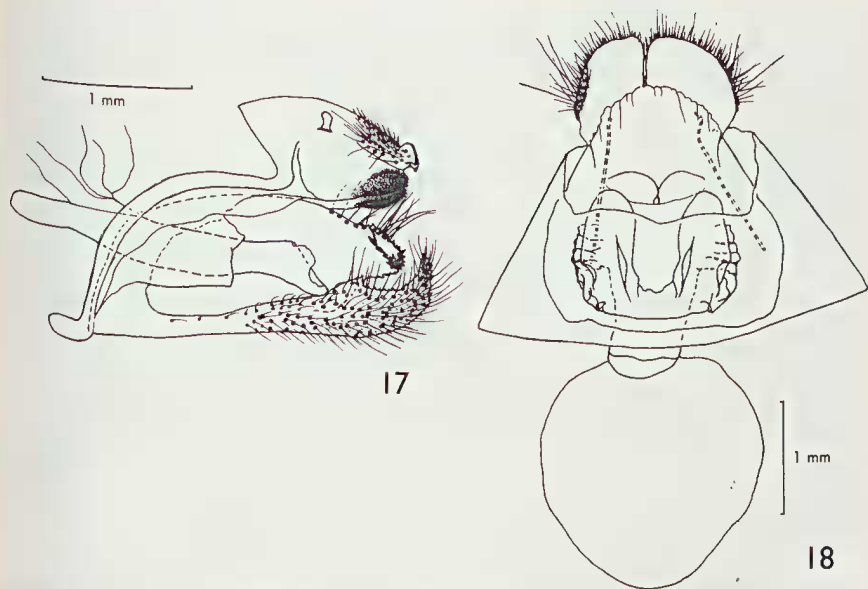
Female genitalia (Fig. 14). Two sclerotized lobes of lamella postvaginalis well developed; a broadly U-shaped sclerotization, folded to produce a crumpled appearance, on dorsal wall of well developed sinus vaginalis; lamella antevaginalis heavily sclerotized, broadly U-shaped, folded to produce crumpled appearance; ductus bursae heavily sclerotized, short; corpus bursae ovoid in section, without accessory pouch; abdominal segment 7 broader anteriorly.

Comments:— In the male the spots between M_1 and M_3 in the fore wing show some variation in size and some specimens show a small spot between CuA_2 and the fold between CuA_2 and $1A+2A$.

C. aestiva may be distinguished from *C. arenaria* by the narrower wings. In *C. aestiva* the hind wing yellow area is similar in colour to that of the fore wing cell spot while in *C. arenaria* the fore wing cell spot is pale yellow and the hind wing area is orange. Dark scales along the veins divide the yellow area on the hind wing above in *C. aestiva* but in *C. arenaria* the veins are covered by orange scales within the area. On the underside of the fore wing, in *C. arenaria*, extensive orange scaling produces a conspicuous dark bar at the end of the cell but this is not conspicuous in *C. aestiva*. The underside of the hind wings of the two species differ greatly. All spots in the subterminal band are confluent in *C. arenaria* while in *C. aestiva* those between $Sc + R_1$ and R_s and between R_s and M_1 are well separated from the others. The subterminal spots between M_1 and M_3 are narrower than the adjoining spots in *C. aestiva* but broader and extending to termen in *C. arenaria*. *C. arenaria* has conspicuously chequered cilia while those of *C. aestiva* are uniformly coloured or faintly chequered. The antennal shaft broadens more gradually into the club in *C. aestiva* than in *C. arenaria* while the nudum segments number 12 in *C. arenaria* and 13 to 14 in *C. aestiva*. *C. aestiva* has been taken in February and *C. arenaria* in September and October.

In colour *C. aestiva* differs from *C. croites* in the same ways as it differs from *C. arenaria* but the arrangement of the spots on the hind wing beneath is similar in *C. aestiva* and *C. croites*. *C. aestiva* differs from *C. croites* in wing shape and in the more gradual broadening of the antennal shaft to form the club in *C. aestiva*. The nudum segments number 13 to 14 in *C. aestiva* and 12 to 13 in *C. croites*. *C. aestiva* has been taken in February while *C. croites* is recorded in July at Pindar and from September to November in other localities.

The male genitalia of the three species of *Croitana* differ slightly. In *C. arenaria* the lateral lobes arising from the junction of the tegumen and uncus are shorter than in *C. aestiva* and longer than in *C. croites* (Fig. 17). Differences in the shape of the two dorsolateral curved projections at the tip of the uncus may also be noted. Most of the ventral surface of the gnathos is covered in spinules in *C. aestiva* and also in *C. arenaria* whereas about half is covered in *C. croites*. The tip of the ampulla is curved inwards in *C. aestiva* and in *C. croites* but not in *C. arenaria*. In *C. aestiva* the tip of the ampulla is more strongly curved inwards and is narrower than in *C. croites*. The tip of the harpe is also narrower in *C. aestiva*. The aedeagus in all three species broadens laterally



Figs 17, 18. Male and female genitalia; *C. croites*, male "Wembley, W.A. Sept. 28, 1961", female "Bunbury, W.A. Oct 7, 1961".

towards the tip but this may not be visible in slide mounted specimens, depending upon coverslip pressure.

The female genitalia of *C. arenaria* have the two sclerotized lobes of the lamella postvaginalis poorly developed but they are more developed in *C. aestiva* and *C. croites* (Fig. 18). The lamella antevaginalis is smaller and less folded in *C. arenaria* than the other species and abdominal segment 7 is uniformly narrow. The corpus bursae in *C. arenaria* and *C. croites* is approximately spherical but in *C. aestiva* it is more elongate.

Discussion

The species described here possess the characters listed by Waterhouse (1932b) in his definition of the genus *Croitana* although his mention of the two dorsolateral projections near the tip of the uncus as "uncus ending in three blunt points" can be misleading. Evans (1949) gave the number of nudum segments as 12 but with the inclusion of the species described here this should now range from 12 to 14. *Croitana* can be immediately distinguished from all other described genera of Trapezitinae, with the exception of *Mesodina* Meyrick, by the absence of the median pair of spurs on the hind tibia. It differs from *Mesodina* however, in the origin of CuA₁ in the fore wing which is only slightly closer to M₃ than to CuA₂ in *Mesodina* but much closer in *Croitana*. Conversely, in the hind wing the origin of CuA₁ is half way between M₃ and CuA₂ in *Croitana* but much closer to M₃ in *Mesodina*. The uncus is very different in the two genera and in *Mesodina* the corpus bursae has an accessory pouch but this is absent in *Croitana*.

There is some doubt about the type locality of *C. croites*. Hewitson labelled the holotype "Austl." and Waterhouse (1932a; 1937) discusses this and concludes that the holotype "no doubt came from near Perth". Evans (1949) gave Carnarvon as the type locality. Colour photographs of the holotype show that it closely resembles some specimens from the Perth area, however too few specimens are available from Carnarvon for an adequate comparison. In any case there is no doubt that the name *C. croites* has been correctly applied to the Western Australian species. An examination of the syntypes of *C. c. pindar* in the Australian Museum shows that they belong to *C. croites*. Some specimens from the northern and inland parts of the range of *C. croites* have markings above paler, the orange patch on the hind wing above smaller, and the underside of the hind wing paler with spots more indistinct, than typical *C. croites*. Such specimens resemble *C. arenaria* above but the spots on the underside of the hind wing retain their positions in *C. croites* and become indistinct, whereas the spots are distinct and in different positions in *C. arenaria*. It is unlikely that *C. arenaria* and *C. aestiva* are seasonal forms of one species. Such forms are unknown in other Trapezitinae and the differences in genitalia, wing shapes, colours and antennae are too great to support such a hypothesis.

C. arenaria and *C. aestiva* are the only Hesperiiidae believed to be confined to the arid Eyrean province of Australia. They, and the related *Proeidosia polysema* (Lower), have previously been largely overlooked in the Alice Springs area suggesting that there is much to be learnt of the distribution of the Trapezitinae in the arid areas of Australia. It may be significant that the discovery of *C. arenaria* in some numbers follows several years of relatively good winter rainfall in central Australia. Nothing is known of the early stages of either species.

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